

WHAT IS CLAIMED IS:

1. A direct fuel injected, internal combustion engine comprising an engine body defining, at least in part, at least one combustion chamber, a fuel injector arranged to spray fuel directly into the combustion chamber, the engine body having an opening
5 through which the fuel injector is inserted, the fuel injector having a contact surface, a thrust member arranged to exert a loading onto the contact surface toward the combustion chamber, a fixing member affixing the thrust member onto the engine body, a seal member disposed within a space existing between the fuel injector and the opening, the thrust member including a thrust section contacting the contact surface of
10 the fuel injector and a fixing section at which the thrust member is affixed onto the engine body by the fixing member, and at least one of the thrust section and the fixing section having a convex surface.

2. A direct fuel injected, internal combustion engine as set forth in Claim 1, wherein the fuel injector and the fixing member have respective axes extend generally
15 parallel to each other, and both the contact surface and a chord length of the convex surface extend generally normal to the axes.

3. A direct fuel injected, internal combustion engine as set forth in Claim 2, wherein the fixing member has a generally partial spherical surface, the fixing section of the thrust member has a generally partial spherical recess, and the spherical surface of the
20 fixing member is received at the spherical recess of the thrust member.

4. A direct fuel injected, internal combustion engine as set forth in Claim 3, wherein the fixing member is a bolt having a bolt head, and the spherical surface is formed at the periphery thereof and under the bolt head.

5. A direct fuel injected, internal combustion engine as set forth in Claim 1, wherein the opening in the engine body is formed with a small diameter section and a
25 large diameter section to define a step portion therebetween, and the seal member is disposed at the step portion.

6. A direct fuel injected, internal combustion engine as set forth in Claim 5, wherein the seal member is a disc spring.

7. A direct fuel injected, internal combustion engine as set forth in Claim 1, wherein the fixing section of the thrust member has two sides, and both of the sides are
30 configured as the convex surface.

8. A direct fuel injected, internal combustion engine as set forth in Claim 1, wherein the thrust member is configured as a forked shape.

9. A direct fuel injected, internal combustion engine as set forth in Claim 1, wherein the engine body comprises an engine block and a cylinder head, the engine block defining at least one cylinder bore in which a piston reciprocates, and the cylinder head is affixed to one end of the engine body and closes the cylinder bore, the cylinder head, together with the cylinder bore and piston, define the combustion chamber.

10. A direct fuel injected, internal combustion engine as set forth in Claim 9, wherein the engine block defining a plurality of the cylinder bores, a plurality of the fuel injectors are provided corresponding to the cylinder bores, a plurality of the thrust members are provided corresponding to the fuel injectors, and the thrust members are unified with each other.

11. A direct fuel injected, internal combustion engine as set forth in Claim 9, wherein the thrust member has an intermediate section between the thrust section and the fixing section, and the cylinder head has a hollow portion at which the fixing section is nested.

12. A direct fuel injected, internal combustion engine as set forth in Claim 9, wherein the cylinder head has a projection, and the thrust member is positioned by registering the fixing section relative to the projection.

13. A direct fuel injected, internal combustion engine as set forth in Claim 9, wherein the cylinder head has a spark plug for firing the fuel and a coolant jacket disposed generally around the spark plug, the fuel injector and the spark plug are adjacent each other, and the fixing member lies on a side of the fuel injector generally opposite of the spark plug.

14. A direct injected, internal combustion engine as set forth in Claim 9, wherein the cylinder head has at least two coolant jackets, both of the coolant jackets are connected with each other through a passage, and the passage is disposed in proximity to the fuel injector.

15. A direct injected, internal combustion engine as set forth in Claim 9, wherein the engine additionally comprises an output shaft driven by reciprocal movement of the piston, and a high pressure fuel pump is driven by the output shaft to supply pressurized fuel to the fuel injector.

16. A direct injected, internal combustion engine as set forth in Claim 1, wherein the engine includes a passage interconnecting the combustion chamber with a crankcase chamber.

17. A direct injected, internal combustion engine as set forth in Claim 1, wherein the engine additionally includes at least one exhaust valve regulating exhaust flow from the combustion chamber.

18. A direct injected, internal combustion engine as set forth in Claim 17, wherein the engine additionally includes at least one intake valve selectively opening to permit air flow into the combustion chamber.

19. A direct injected, internal combustion engine as set forth in Claim 1 in combination with a marine propulsion device, wherein the engine additionally comprises an output shaft coupled to the marine propulsion device.

20. A direct fuel injected, internal combustion engine comprising an engine body defining, at least in part, at least one combustion chamber, a fuel injector arranged to spray fuel directly into the combustion chamber, the engine body having an opening through which the fuel injector is inserted, the fuel injector having a contact surface, a thrust member arranged to exert a loading onto the contact surface toward the combustion chamber, a fixing member affixing the thrust member onto the cylinder head, a seal member disposed within a space existing between the fuel injector and the opening, the thrust member including a thrust section contacting the contact surface of the fuel injector and a fixing section at which the thrust member is affixed onto the cylinder head by the fixing member, and means for orienting the thrust member so as to produce a generally uniform loading about the contact surface of the fuel injector.